7 (a) Using ${}^nC_r = \dfrac{n!}{r!(n-r)!}$ show that ${}^nC_2 = \dfrac{n(n-1)}{2}$

[2 marks]

7 (b) (i) Show that the equation

$$2 \times {}^nC_4 = 51 \times {}^nC_2$$

simplifies to

$$n^2 - 5n - 300 = 0$$

[3 marks]

7 (b) (ii) Hence, solve the equation

$$2 \times {}^nC_4 = 51 \times {}^nC_2$$

[2 marks]